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TUNING PECTIN METHYLESTERIFICATION TO PROTECT CELL WALL INTEGRITY FOR IMMUNITY TO PATHOGENS

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Infection by necrotrophic fungi is a complex process that starts with the breakdown of the cell wall (CW) matrix initiated by CW degrading enzymes and results in extensive tissue maceration. Plant exploits induced defense mechanisms based on biochemical modification of CW components to protect themselves from pathogen attacks. We found that plants activate CW remodeling mechanisms based on matrix strengthening, callose deposition and synthesis of structural defense proteins to resist to CW degradation upon necrotrophic infection. In particular, pectin methylesterification in cell wall of *Arabidopsis* and *Wheat* was altered in response to *Botrytis* and *Fusarium* infection. Pectin is secreted in highly esterified form in the apoplast, where it is demethylesterified by pectin methylesterases (PMEs). PME activity can be finely regulated by two classes of proteins: PME-specific subtilases (SBTs) and PME inhibitors (PMEIs). Our findings in *Arabidopsis*, *Vitis* and *Wheat* point to specific PME, PMEIs and SBTs as important factors for CW integrity maintenance in plant immunity. The new CW biochemical and genetic markers will be useful for future selections of cultivars improved in resistance to pathogens.